

Applicant: Takehiro Fukii
Serial No.: 10/792,200
Filing Date: March 1, 2004
Examiner: Bradley Smith
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REMARKS

The last Office Action in the above-identified application and the references cited by the Examiner have been carefully considered. The claims have been amended in a sincere effort to define more clearly and more specifically features of applicant's invention which distinguish over the art of record.

The finality of the restriction requirement noted in Paragraph 1 on Page 2 of the Office Action is acknowledged. Accordingly, Claims 8 and 9 of Group II have been cancelled.

The Examiner's comments in Paragraph 2 on Page 2 of the Office Action concerning the requirement for a reference to applicant's parent application is acknowledged and gratefully appreciated. Such a specific reference has been included in a Preliminary Amendment filed on March 1, 2004. Because the parent application, Serial No. 10/019,508, has now been abandoned, the specification has been amended to include the current status of the parent application. If the Examiner has any questions or would prefer a different statement in the application referring to the parent application, it is respectfully requested that he contact the undersigned attorney at the telephone number given below.

Claims 4-7, 14 and 15 are pending in the application. Claims 5, 6, 14 and 15 were only objected to, as noted in Paragraph 5 on Page 4 of the Office Action, as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

The probable allowance of Claims 5, 6, 14 and 15 is acknowledged and gratefully appreciated. Accordingly, Claim 5 has been amended to incorporate all of the limitations of original Claim 4 and placed in independent form. Therefore, it is respectfully urged that Claim 5 is now in proper form for allowance and such action is respectfully solicited.

Claim 6 depends directly on amended Claim 5, now in independent form. Accordingly, it is respectfully urged that Claim 6, because of its dependency on amended Claim 5, is in proper form for allowance and such action is respectfully solicited.

Claims 14 and 15 respectively depend from amended Claim 5, now in independent form, and Claim 6. Accordingly, it is respectfully urged that Claims 14 and 15 are in proper form for allowance and such action is respectfully solicited.

Claims 4 and 7 have been rejected on under 35 U.S.C. 102 (e) as being anticipated by U.S. Patent No. 6,483,623 (Maruyama). The Examiner contends that the Maruyama patent discloses a substrate (1A) formed with an electrode, an LED chip (5) bonded onto said substrate, a transparent or translucent resin (2) with which the LED chip is molded, and a reflector which reflects a light emitted from said LED chip, wherein the transparent or translucent resin has a convex portion, and said reflector has a concave portion to be fitted into the convex portion. The Examiner kindly refers the applicant to Figure 2B of the Maruyama patent for disclosing this structure.

With respect to Claim 7, the Examiner contends that the Maruyama patent discloses an LED chip that has a bonding wire extending from a top surface, and that the concave portion is formed directly above the LED chip, again, referring applicant to Figure 2B of the Maruyama patent.

Claims 4 and 7 have been amended herein to more specifically define and clarify features of applicant's invention which distinguish over the art of record. More specifically, to clarify the differences between the claimed invention and the lamp apparatus disclosed in the Maruyama patent, Claim 4 has been amended to more specifically define the reflector as having a throughhole which is fitted into the convex portion of the transparent or translucent resin, and Claim 7 has been amended to more specifically define the throughhole as being formed directly above the LED chip.

It is respectfully urged that Claims 4 and 7, as now amended, patentably distinguish over the Maruyama patent and are allowable.

Applicant respectfully refers the Examiner to Figures 5, 6(A) and 6(B) of the subject application which illustrate one form of the invention defined by amended Claims 4 and 7. Applicant also respectfully refers the Examiner to Page 15, Line 3 of the specification to Page 17, Line 21 for a complete description of the particular structure defined by amended Claims 4 and 7 and the semiconductor device shown in Figures 5, 6(A) and 6(B).

The throughhole 24 which is now recited in amended Claims 4 and 7 is formed through the reflective case 14 on its top plate 14a. As defined by Claim 4 and, due to its dependency, Claim 7, the throughhole is fitted into the convex portion of the transparent or translucent resin 16.

There are several advantages to having such structure as defined by Claims 4 and 7. First, by having the convex portion of resin 16 fitted into the throughhole 24 formed through the case 14, the reflective case 14 is held onto transparent or translucent resin 16 such that both are integrated to each other. Thus, it is less likely that case 14 will become separated from the resin.

Second, since, as defined by amended Claim 7, the throughhole 24 is formed directly above the LED chip 20, the top of the bonding wire 22 extending from the upper surface of the chip may be housed within the throughhole 24. Thus, even if the height of the case 14 is decreased, the bonding wire 22 never contacts the case 14, which helps prevent disconnecting the bonding wire 22 when the case 14 is attached to the transparent or translucent resin 16.

Third, by having throughhole 24, as defined by Claims 4 and 7, formed through the reflective case 14, a lighting test apparatus for an upper-emissive type semiconductor light-emitting device can be used with this side-emission type device defined by Claims 4 and 7. By measuring the amount of light emitted through the throughhole 24 formed in the reflective case 14 and applying a ratio of the area of the light-emitting surface and the area of the

throughhole multiplied by the amount of light emitted from the throughhole, the amount of light emitted from the side surfaces of the semiconductor light-emitting device may be determined.

It is respectfully urged that the Maruyama patent does not disclose the specific structure now defined by amended Claims 4 and 7, and applicant respectfully refers the Examiner to Figures 2(a) and 2(b) of the Maruyama patent. It can be seen in Figure 2(b) of the Maruyama patent that the concave reflector mirror, which is referred to in the specification of the Maruyama patent by reference no. 7 but which is unnumbered in Figure 2(b) of the patent, is entirely embedded within the resin 2 of the lamp apparatus shown in the Maruyama patent. The concave reflector mirror 7 is formed on one side of the LED chip 5, and reflects light emitted by the LED chip held above it by lead frames 1A and 1B through a light pickup window 3. This structure is entirely different from that shown in Figures 5, 6(A) and 6(B) and now set forth in amended Claims 4 and 7 of the subject application. The concave reflector mirror 7 has no throughhole formed in it, such as defined by amended Claims 4 and 7 of the subject application. Furthermore, the lamp apparatus of the Maruyama patent is a conventional top light-emissive device, and not a side-emissive device such as defined by Claims 4 and 7 of the subject application.

Since there is no throughhole through the concave reflector mirror 7 in the Maruyama lamp apparatus, the bonding wire 6 cannot be received by such a throughhole to allow the concave reflector mirror 7 to be moved closer to the LED chip 5. Therefore, the structure of the Maruyama lamp apparatus does not solve the problem associated with conventional side-emission type semiconductor light-emitting devices, where the bonding wire may become disconnected when a reflective case 14 is attached to the assembly.

Also, because there is no throughhole formed through the concave reflector mirror 7 in the Maruyama lamp apparatus, there is no light emitted through the reflector mirror to be measured in order to determine the amount of light emitted from another surface of the lamp apparatus, as there is no other surface in the Maruyama lamp apparatus which emits light. This is why it is respectfully urged that the Maruyama patent discloses a lamp apparatus which is entirely different from the side-emission type semiconductor light-emitting device

defined by amended Claims 4 and 7. The problems associated with manufacturing the Maruyama lamp apparatus and a side-emission type semiconductor light-emitting device such as defined by amended Claims 4 and 7, and the structure of each, are entirely different.

Thus, the throughhole formed through the reflective case which is fitted onto the convex portion of the transparent or translucent resin helps hold the reflective case to the resin and integrates the two together, which improves the adhesion between the reflective case and the resin. Such structure is now more specifically defined by amended Claim 4. No such structure is found in the Maruyama lamp apparatus.

Furthermore, the throughhole now defined by amended Claim 7 formed in the reflective case is situated directly above the LED chip so that the top of the bonding wire may be housed within the throughhole and that, even if the height of the reflective case is made lower, the bonding wire does not contact the case where it may become disconnected when the case is being attached onto the device. The Maruyama lamp apparatus has no such throughhole formed in the concave reflective mirror 7.

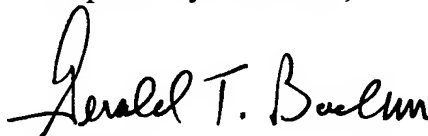
Accordingly, it is respectfully urged that Claims 4 and 7, as now amended, patentably distinguish over the Maruyama patent and are allowable.

The remaining reference of record, published U.S. Patent Application Serial No. 09/925,829 (Okazaki) has also been carefully reviewed, and, although not applied against either of Claims 4 or 7, it is respectfully urged that the Okazaki patent does not disclose the features now more specifically set forth in amended Claims 4 and 7 and is less relevant than the Maruyama patent applied against the unamended claims.

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In view of the foregoing amendments and remarks, entry of the amendments to Claims 4, 5 and 7, reconsideration of Claims 4-7, 14 and 15 and allowance of the application with Claims 4-7, 14 and 15 are respectfully solicited. If the Examiner has any comments or questions which may expedite the allowance of this application, it is respectfully requested that he contact the undersigned attorney at the telephone given below.

Respectfully submitted,

A handwritten signature in black ink, reading "Gerald T. Bodner". The signature is written in a cursive style with a large initial "G".

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